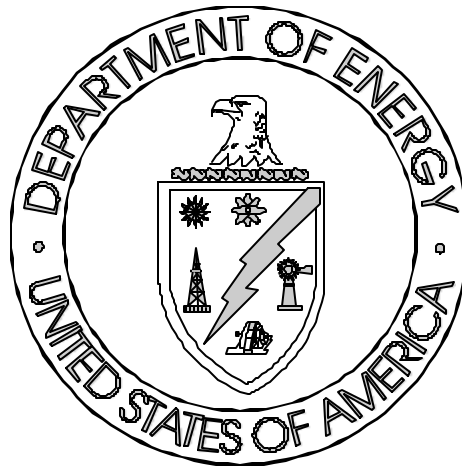


**U.S. DEPARTMENT OF ENERGY  
DEPARTMENT-WIDE  
FUNCTIONAL AREA QUALIFICATION STANDARD**

**TECHNICAL TRAINING  
QUALIFICATION STANDARD**

**Defense Nuclear Facilities Technical Personnel**



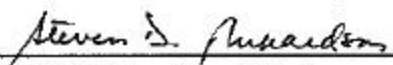
**U.S. Department of Energy  
Washington, D.C. 20585**

**Revision 1**

**December 1999**

## APPROVAL

The Federal Technical Capability Panel consists of senior Department of Energy managers responsible for overseeing the Federal Technical Capability Program. This Panel is responsible for reviewing and approving the Qualification Standard for Department-wide application. Approval of this Qualification Standard by the Federal Technical Capability Panel is indicated by signature below.

  
S.D. Richardson, Chair  
Federal Technical Capability Panel

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## **ACKNOWLEDGEMENTS**

The Oak Ridge Operations Office Training and Development Group is the sponsor for the Technical Training Functional Area Qualification Standard. The sponsor is responsible for coordinating the development and review of the functional area qualification standard by subject matter experts to ensure that the technical content of the standard is accurate, current, and adequate for DOE-wide application for those involved with technical training. The sponsor, in coordination with the Federal Technical Capability Panel, is also responsible for maintaining the standard.

The following subject matter experts participated in the review and revision of the Technical Training Functional Area Qualification Standard:

- Audrey Clark, Nevada Operations Office
- Al Corbett, Savannah River Operations Office
- Judy DiGregorio, Oak Ridge Operations Office
- Ted Hinkel, Oak Ridge Operations Office
- Doris Hixon, Savannah River Operations Office
- Steven Petersen, Office of Environment, Safety, and Health
- Richard Self, Richland Operations Office
- Jim Vosburg, Oak Ridge Operations Office

**U.S. DEPARTMENT OF ENERGY  
FUNCTIONAL AREA QUALIFICATION STANDARD**

**FUNCTIONAL AREA**

Technical training personnel in the Department of Energy (DOE) complex are responsible for the development and administration of training delivered to DOE and contractor defense nuclear facility technical personnel. This extends to other DOE and contractor personnel who have safety, health, and environmental responsibilities for other science and technology intensive facilities and programs.

To fulfill these responsibilities, technical training personnel must possess a broad range of skills and knowledge including:

- A basic understanding and application of the systematic approach to training.
- The design and conduct of technology-supported learning.
- The oversight of contractor training programs.
- The organization and administration of training centers.

**PURPOSE**

The primary purpose of the Technical Qualification Program is to verify that employees have the requisite technical competency to support the mission of the Department. Technical qualification programs form the basis for the development and assignment of personnel responsible for ensuring the safe operation of defense nuclear facilities and other science and technology intensive facilities and programs.

Integration of the Technical Qualification Program with the Department's personnel processes should be used to support the Department's drive for technical excellence. To this end, the competency requirements defined in the qualification standards should be aligned with and integrated into the recruitment and staffing processes for technical positions. The technical qualification standards become the basis for developing vacancy announcements, qualification requirements, crediting plans, interview questions, and other criteria associated with the recruitment, selection, and internal placement of technical personnel.

The Technical Training Functional Area Qualification Standard establishes common functional area competency requirements for all technical training personnel performing functions related to DOE defense nuclear facilities. The competency requirements contained in this standard are fulfilled so that technical employees will possess the minimum requisite competence to carry out their functional area duties and responsibilities. Additionally, these competency requirements provide the functional foundation to ensure successful completion of the appropriate office/facility-specific qualification standard.

The Technical Training Functional Area Qualification Standard identifies the competencies related to training and qualification program processes and requirements. It does not identify the specific technical subject matter competencies associated with designing or developing technical training programs, or understanding the content of a training or qualification program being evaluated. These competencies can be addressed in the office/facility-specific qualification standards.

## **APPLICABILITY**

This standard applies to all DOE technical training personnel responsible for managing, administering, and/or evaluating contractor or federal technical training and qualification programs at defense nuclear facilities. Other training personnel designated by headquarters or field element line management as participants in the Technical Qualification Program are also required to satisfy the competency requirements of this standard.

## **IMPLEMENTATION REQUIREMENTS**

This qualification standard shall be used to identify, train, and qualify technical training personnel including managers, administrators, evaluators, trainers, and technologists.

The competency statements contained in this qualification standard define the expected knowledge and/or skill that an individual must possess. The supporting knowledge and/or skill statements further describe the intent of the competency statements. **The supporting knowledge and/or skill statements are not requirements and do not necessarily have to be fulfilled to meet the intent of the competency.**

The competencies identify a familiarity level, a working level, or an expert level of required knowledge; or they require the individual to demonstrate the ability to perform a task or activity. These levels are defined as follows:

**Familiarity level** is defined as basic knowledge of, or exposure to, the subject or process adequate to discuss the subject or process with individuals who are more knowledgeable.

**Working level** is defined as the knowledge required to monitor and assess operations/activities, to apply standards of acceptable performance, and to reference appropriate materials and/or expert advice as required to ensure the safety of departmental activities.

**Expert level** is defined as a comprehensive, intensive knowledge of the subject or process sufficient to provide advice in the absence of procedural guidance.

**Demonstrate the ability** is defined as the actual performance of a task or activity in accordance with policy, procedures, guidelines, and and/or accepted industry or department practices.

Headquarters and field elements shall establish a program and process to ensure that all defense nuclear facility technical personnel, required to participate in the Technical Qualification Program, meet the competency requirements contained in this standard. Documentation of the completion of the requirements of this standard shall be included in the employee's training and qualification record.

Equivalencies may be granted for individual competencies based upon an objective evaluation of the employee's prior education, experience, and/or training. Equivalencies shall be requested by the individual's immediate supervisor, and approved one level above the individual's immediate supervisor. Documentation of equivalencies shall indicate how the competency requirements have been met. The supporting knowledge and/or skill statements, while not requirements, should be considered before granting equivalency.

Headquarters and field elements should use the supporting knowledge and/or skill statements as a basis for evaluating the content of any training courses used to provide individuals with the requisite knowledge and/or skill required to meet the qualification standard competency statements. The training methods may include self-study guides, formal courses, mentoring, on-the-job training, and technology-supported learning activities.

## **EVALUATION REQUIREMENTS**

1. Attainment of the competencies listed in this qualification standard shall be documented by a qualifying official or the technical training person's immediate supervisor using any of the following methods:
  - a. Documented evaluation of equivalencies
  - b. Documented results of a written examination
  - c. Documented oral evaluation
  - d. Documented observation of performance

## **CONTINUING TRAINING AND PROFICIENCY REQUIREMENTS**

Technical training personnel shall participate in continuing training as necessary to improve their performance and ensure they stay current with changing technology and new requirements. This may include courses and/or training in:

- Learning theory
- Learning, instructional, and performance technology
- Federal and DOE initiatives and regulations, e.g.,
  - Federal Appropriations Law and updates
  - Environmental rules and regulations, and updates
  - OSHA rules and regulations, and updates

- Management and administrative systems, e.g.,
  - Integrated safety management systems
  - Performance-based management contracting
  - Contractor performance-based business management processes

Technical training personnel shall maintain their proficiency by completing required continuing training and performance of the duties and responsibilities of a technical training professional within DOE on a regular basis.

## **DUTIES AND RESPONSIBILITIES**

The duties and responsibilities of technical training personnel include:

1. Analyze contractor and federal training and qualification requirements contained in DOE Orders, rules, and other directives. Assess these regulatory requirements for impact on the organization's training budget and level of effort to meet these requirements.
2. Facilitate the assessment and prioritization of individual training and development needs. Collaborate with managers, supervisors, and individual staff to establish Individual Development Plans (IDPs) that document those needs.
3. Assess and prioritize organizational training needs and requirements based on data from IDPs, needs assessments conducted with supervisors and managers, and other known factors having an impact upon training needs.
4. Develop and implement strategies, plans, and budgets to meet organizational needs and requirements.
5. Evaluate both internal and vendor provided training products. Determine the best source of training based on cost and usefulness to the organization and individual.
6. Collaborate with the DOE-wide training community to analyze, design, develop, implement, evaluate, and share required courses and programs that have application beyond the local organization.
7. Design and develop training curriculum and/or courses using methods suitable for the target audience, including technology-supported learning when appropriate and cost effective.
8. Conduct training sessions and formal presentations.
9. Provide training resources such as DOE guides to good practices.
10. Update employees on new training materials and products.



11. Provide technical assistance to line management in the development and implementation of the department's Technical Qualification Program for federal personnel.
12. Evaluate contractor training and qualification programs to ensure compliance with applicable orders and regulations, and that personnel possess the requisite knowledge and skills required of their positions.
13. Evaluate the adequacy of contractor organization and infrastructure to ensure that training and qualification programs are implemented consistently, effectively, and economically.
14. Develop written reports to document the results of training and qualification program evaluations. Monitor, track, and evaluate actions to ensure that identified deficiencies are corrected. Close-out corrective actions.

## **BACKGROUND AND EXPERIENCE**

The U.S. Office of Personnel Management's *Qualification Standards Handbook* establishes minimum education, training, experience, and other relevant requirements applicable to a particular occupational series or grade level, as well as alternatives to meeting specified requirements.

The preferred education and experience for technical training personnel is as follows:

1. Education:

Bachelor's degree in instructional technology, training, or education; or meet the alternative requirements specified in the *Qualification Standards Handbook*.

2. Experience:

Experience in technical training program design, development, implementation, and management. Individuals performing training and qualification program evaluations should possess technical abilities similar to the area being evaluated, and have prior experience in training program management and implementation.

## REQUIRED TECHNICAL COMPETENCIES

*Note: When regulations, DOE directives, or other industry standards are referenced, the most recent revision should be used.*

1. Technical training personnel shall demonstrate an expert level of knowledge and ability to implement the systematic approach to training model. This includes the ability to:
  - Conduct a job or task analysis or needs assessment, analyze the data, and provide recommendations based on results.
  - Design a training course or program to satisfy training requirements.
  - Develop a training course and supporting materials.
  - Implement a training course or program.
  - Evaluate a training course or program as part of the systematic approach to training process or to assess return on investment.

### Supporting Knowledge and/or Skills

- a. State the five steps of the systematic approach to training process and produce a basic sketch showing the relationship between the steps.
- b. Referring to DOE-HDBK-1078-94, *Training Program Handbook: A Systematic Approach to Training*, describe in detail the activities that occur in each of the five steps of the systematic approach to training process, and list the products that may result from each of the steps.
- c. Describe the purpose and process for conducting a needs analysis, job analysis and task analysis.
- d. Describe the functional relationship between tasks, learning objectives, training materials, and trainee evaluations.
- e. State and describe the components of an internal training program evaluation process to assess the effectiveness of training.
- f. Based on an analyzed training need, design, develop, implement, and evaluate a course of instruction.

2. Technical training personnel shall demonstrate a working level knowledge of DOE training organizations, strategic initiatives, roles and responsibilities, and training administration and infrastructure.

Supporting Knowledge and/or Skills

- a. Describe the contents of the *DOE Corporate Education, Training, and Development Business Plan*, and explain how the plan applies to the field and headquarters training offices.
  - b. Describe the Federal Technical Capability Program and its application to the field and headquarters training offices.
  - c. State and discuss some of the attributes of an efficient and effective technical training organization at a defense nuclear facility.
  - d. State and discuss the advantages and the disadvantages of centralized and decentralized training organizations.
  - e. Explain the purpose of a training policy and procedure manual and discuss the typical policies and procedures that may be found in this manual.
  - f. Describe the roles and responsibilities of line management, the training organization, and the employee as related to training and qualification.
  - g. Explain how to use facilities, equipment and materials in an efficient manner to implement the training process.
  - h. Describe the purpose and attributes of a technical training resource library.
  - i. Describe the process necessary to share training materials and resources among the federal and contractor training organizations.
3. Technical training personnel shall demonstrate the ability to plan, conduct, and document a training needs assessment or job analysis of a position to determine the training requirements associated with that position.

Supporting Knowledge and/or Skills

- a. Identify the position to be assessed.
- b. Gather appropriate reference and resource materials related to the position.

- c. Interview subject matter expert(s) and supervisors associated with the position to determine the duties and responsibilities in terms of tasks and/or competencies.
  - d. Determine the knowledge, skills, and abilities (or specific training) required to support the identified duties and responsibilities.
  - e. Validate the results of the needs assessment with other subject matter experts and/or the responsible supervisor.
4. Technical training personnel shall demonstrate a working level knowledge of training course and/or program design techniques and methodologies.

Supporting Knowledge and/or Skills

- a. Define the term entry-level requirements. Describe how they are established, and how they influence the training program or course design.
  - b. State the difference between terminal learning objectives and enabling learning objectives.
  - c. Describe the attributes of a well-written learning objective, and discuss when implied conditions and standards are sufficient.
  - d. Explain how learning objectives are developed and validated to ensure technical adequacy and accuracy.
  - e. Explain how and why learning objectives are sequenced.
  - f. Describe the process for grouping and sequencing objectives when developing a training course or a training program.
  - g. Describe and differentiate the design features for the various training settings (including technology-supported learning) that may be selected when designing a training curriculum.
5. Technical training personnel shall demonstrate a working level knowledge of the process, techniques and methodology associated with training material development.

Supporting Knowledge and/or Skills

- a. Explain why formal and documented training materials are necessary in a formal, systematic approach to training process.

- b. Explain the relationship between learning objectives, training materials, and the presentation of instruction.
  - c. Referring to DOE-HDBK-1078-94, describe the attributes, content, and format of a particular training material.
  - d. Describe the advantages and disadvantages of traditional and nontraditional (such as technology-supported learning) delivery systems and associated materials and media.
  - e. Explain the use and development of instructional media to support training guides and lesson plans.
  - f. Using the results of a training needs assessment or job analysis, develop a course outline, learning objectives, and a lesson plan to reflect the required knowledge and skills.
  - g. Develop training materials to support the presentation of an assigned classroom, OJT, self-study, or laboratory training session.
6. Technical training personnel shall demonstrate a working level knowledge of adult learning methodologies and instructor techniques required to conduct a training session or evaluate the effectiveness of classroom training sessions.

Supporting Knowledge and/or Skills

- a. State and discuss the factors that an instructor can control that affect learning during classroom instruction, including a discussion of dealing with difficult trainees.
- b. Describe the attributes of an effective classroom learning environment.
- c. Compare and contrast various classroom instructional methodologies including lecture, role-play, case studies, discussions, and practical classroom demonstrations.
- d. Describe the attributes of an effective classroom instructor including use of training and media materials, effective speaking, questioning techniques, and subject matter expertise.
- e. Conduct a classroom training session or make a formal presentation to a group of personnel.

7. Technical training personnel shall demonstrate a working level knowledge of on-the-job training (OJT) techniques, methodology, and implementation and apply that knowledge to implement and/or evaluate OJT programs in the field.

Supporting Knowledge and/or Skills

- a. List and discuss the potential advantages and disadvantages associated with implementing an OJT program.
  - b. State and describe the roles and responsibilities of the training organization and line management to ensure effective implementation of an OJT program.
  - c. Discuss the differences between formal and informal OJT.
  - d. Describe the role of the trainer, the evaluator, and the trainee in the OJT process.
  - e. List and discuss the process steps that OJT instructors use to help trainees learn on the job.
  - f. Describe the format and content of a typical OJT training guide and job performance measure or evaluation standard, including a discussion of the essential elements of each.
  - g. List and discuss the key elements and components of a valid and reliable practical evaluation process for evaluating trainee knowledge and skill upon completion of OJT.
8. Technical training personnel shall demonstrate a working level knowledge of oral, written, and performance evaluation techniques and methodologies.

Supporting Knowledge and/or Skills

- a. Explain the purpose of testing and why tests should be based upon learning objectives.
- b. List and describe the different types of written test item formats that may be used, and discuss the advantages and disadvantages of each.
- c. Describe the key elements of an adequate oral evaluation process, and discuss the advantages and disadvantages of this method of evaluation.
- d. Describe the key elements of an adequate performance evaluation or operational evaluation process, and discuss the advantages and disadvantages of this method of evaluation.

- e. Explain how test item statistics are used to evaluate the quality (validity and reliability) of test items and the training on which they are based.
  - f. Describe the purpose and use of examination banks.
  - g. List and discuss the key elements and components of a valid and reliable testing program to evaluate trainee knowledge during, or upon completion of classroom training.
9. Technical training personnel shall demonstrate a working level knowledge of the requirements and attributes associated with an effective records management system.

Supporting Knowledge and/or Skills

- a. Describe the difference between individual training records and program training records.
  - b. Describe the difference between training records and qualification records.
  - c. List and discuss the items that would typically be found in an individual training and qualification record.
  - d. List and discuss the items that would typically be found in a training program record.
  - e. Explain the legal aspects associated with accessing individual training and qualification records.
  - f. Describe the difference between an archival records system and a dynamic record retrieval system.
10. Technical training personnel shall demonstrate a working level knowledge of the requirements of applicable DOE orders and rules to determine if a contractor at a facility is implementing effective training and qualification programs.

Supporting Knowledge and/or Skills

- a. Referring to the following sample of orders and rules, describe the purpose, applicability, and roles and responsibilities as they pertain to oversight of contractor training and qualification programs.
  - 10 CFR 820, *Procedural Rules for DOE Nuclear Activities*
  - 10 CFR 830, *Nuclear Safety Management*
  - 10 CFR 835, *Occupational Radiation Protection*

- DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*
  - DOE Order 5480.20A, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*
  - DOE O 151.1, *Emergency Management System*
  - DOE O 350.1, *Contractor Human Resource Management Programs*
  - DOE O 414.1A, *Quality Assurance*
  - DOE O 430.1A, *Life Cycle Asset Management*
- b. Identify, retrieve, and prepare a summary of all the applicable orders and rules for training and qualification oversight activities for a given DOE facility.
- c. State and describe the purpose and applicability of DOE-STD-1070-94, *Guidelines for Evaluation of Nuclear Facility Training Programs*.
- d. Apply the evaluation process indicated in DOE-STD-1070-94, including evaluation methods, evaluation frequency, and the application of a graded approach to an assigned evaluation of a contractor's training program, and report the results.
- e. Describe the process for determining adequate compliance with the requirements listed in the above orders and rules and the severity and consequences associated with not being in compliance.
11. Technical training personnel shall demonstrate a working level knowledge of DOE O 360.1A, *Federal Employee Training*, and DOE M 360.1A-1, *Federal Employee Training Manual* sufficient to ensure that training programs for federal personnel are accomplished in accordance with the requirements of the order.

Supporting Knowledge and/or Skills

- a. Discuss the duties and responsibilities of line management, headquarters personnel and training support personnel as indicated in the order and manual.
- b. Explain the latitude and restrictions associated with employee training.
- c. Describe the requirements for training plans, resources, and reports.
- d. Explain the requirements associated with requesting and using training resources as described in the order.
- e. State the purpose and requirements associated with establishing workforce development programs with employees.



- f. Describe the requirements of the Technical Qualification Program.
12. Technical training personnel shall demonstrate a working level knowledge of the content and applicability of the DOE resources and guidance documents related to the implementation of DOE federal and contractor training programs.

Supporting Knowledge and/or Skills

- a. Describe the general content and explain the use and applicability of the DOE guides to good practice for training and qualification programs and processes.
  - b. Research sources such as the Internet for applicable technical training and qualification information and materials.
13. Technical training personnel shall demonstrate a working level knowledge of contracts and procurement processes and procedures, and how they apply to procurement of training-related services or products.

Supporting Knowledge and/or Skills

- a. Describe the process and requirements for paying for individual training courses as described in DOE O 360.1A and M 360.1A-1.
- b. Explain how procurement requests are generated and approved for training services.
- c. State and discuss the requirements and limitations associated with open competition for services and products.
- d. Describe how the type of contract, such as performance-based contracts and fee-based contracts, affects the assessment and evaluation of a contract.
- e. Describe the process for developing a scope of work, request for proposal, and evaluation criteria to determine the best source or provider of training services or products.
- f. Describe the requirements and process for using existing government sources for training services and products including:
  - Management and operating contractors
  - Support services contractors
  - Other government agencies
  - Local schools and universities

- g. Describe the roles and responsibilities of the contracting officer representative and explain the relationship between the contracting officer representative, the contracting officer, and the contractor.
  - h. Conduct a cost-benefit review and analysis for the selection of one of two given vendor courses, and report the results.
- 14. Technical training personnel shall demonstrate a familiarity level of knowledge of project management practices sufficient to manage training-related programs and projects.

Supporting Knowledge and/or Skills

- a. Explain the purpose of project management and, describe the life cycle of a typical project.
  - b. Describe typical documents and data sources used in project management.
  - c. Identify and explain the major elements of a project, and discuss their relationship.
  - d. Explain the purpose and use of a project management plan.
  - e. Discuss the relationship between a work breakdown structure and the cost and schedule.
  - f. Describe the purpose of schedules, and discuss the use of milestones and activities.
  - g. Describe the critical path method of scheduling.
- 15. Technical training personnel shall demonstrate a working level knowledge of basic assessment principles and processes associated with evaluating DOE contractors such as operational readiness reviews and business management oversight reviews. This includes the planning and use of observations, interviews, and document reviews to assess compliance with established criteria or requirements.

Supporting Knowledge and/or Skills

- a. Describe the role of the evaluator with respect to performance of oversight of contractors at government-owned, contractor-operated facilities.

- b. Describe the requirements and limitations associated with the evaluator's interface with contractor employees when conducting assessments or evaluations.
  - c. Explain the impact of the Price-Anderson Amendments Act upon contractor oversight activities, particularly in the conduct of performance evaluations and enforcement actions associated with 10 CFR Parts 820, 830, and 835.
  - d. Explain the essential elements of a performance-based assessment including the areas of investigation, fact-finding, and reporting.
  - e. Explain the purpose and contents of a typical assessment report, and describe how to determine who should be on the distribution list for the report.
  - f. Explain the essential elements and processes associated with the following assessment activities:
    - One-on-one interviews
    - Entrance and exit meetings
    - Corrective action implementation
    - Closure process
  - g. Describe the actions to be taken if the contractor challenges the assessment findings and explain how such challenges can be avoided.
16. Technical training personnel shall demonstrate the ability to plan, conduct, and document an overall evaluation of a technical training and qualification program or activity, and report those results to management in a concise and effective manner.

Supporting Knowledge and/or Skills

- a. Establish the criteria to be used as a basis for conducting the evaluation.
- b. Establish points of contact with the organization being evaluated.
- c. Gather information pertinent to the evaluation by reviewing training materials, interviewing personnel, observing training activities, and reviewing training records.
- d. Document the results of the data collection phase in field notes.
- e. Compare the results of the review phase with the criteria established for the evaluation and determine if deficiencies exist.

- f. Document the results of the overall training and qualification evaluation in a formal written report that includes the status of meeting the established criteria, identifies deficiencies or good practices, and suggests recommendations for improvement.
- g. Resolve conflicting or inconclusive observations or findings obtained from other evaluators on an evaluation team.
- h. Verbally report the results of the evaluation to contractor facility management and DOE management.
- i. Perform follow-up activities as applicable to ensure implementation of corrective actions, including tracking and close-out.
- j. Describe the process for determining and calculating a return on investment for a given training course or program.